SOIL SURVEY OF CLINTON COUNTY, ILLINOIS.

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LOCATION AND BOUNDARIES OF THE AREA.

Clinton County, Ill., comprises an area of about 490 square miles, (314,111 acres), located in the south central portion of the State. Carlyle, the county seat, is a town of about 2,000 population. It is situated on the Kaskaskia River, 45 miles east of St. Louis, Mo. The central portion of Clinton County is crossed from east to west by the Baltimore and Ohio Railroad and by the Southern Railroad. The Jacksonville and St. Louis Railroad crosses the northern portion of the county. Clinton County lies between the parallels 38° 30′ and 38° 45′ north latitude, and between the meridians of 89° 10′ and 89° 40′ west longitude. It has a total population of about 20,000, and its chief industries are agriculture and coal mining. (See fig. 13, p. 465.)

HISTORY OF SETTLEMENT AND AGRICULTURAL DEVELOPMENT.

Under the French occupation of the Illinois country no settlement was established in Clinton County, although it formed a portion of the hunting grounds which supplied the Illinois and Kaskaskia trading posts with furs. During French occupation land grants were made in the American bottoms in St. Clair County, which extended from the Mississippi River to the Kaskaskia, and perhaps thus included portions of Clinton County. Under British occupation the records of these grants were in part destroyed, and new grants were made to British citizens. These were finally confirmed by the new Government of the United States. In 1813 Congress granted the right of preemption, and immigrants poured in from North Carolina, Kentucky, and Tennessee. In 1808 a wagon road had already been laid out through Clinton County, and a blockhouse was erected in 1811, where this road crossed the Kaskaskia. The town of Carlyle was later located at this place.

Previous to the war of 1812 a few squatters had settled within the borders of Clinton County. For the most part these moved to points of greater safety during the war. The first regular land entries were made in September, 1814, by John Journey, Charles Cox, and James McCracken, in what is now Sugar Creek Township. About 1818 Car-

lyle was laid out as a "boom town" by Charles and Thomas Slade, merchants from New England.

Most of the early settlements were located in the timber belts near the stream courses, for security against Indian attacks. The prairies were occupied later, when this danger had passed away. By 1820 there had been preempted within the county 30,000 acres of land, and corn, wheat, meat, and live stock were exported. During the next ten years corn sold for 12½ to 15 cents a bushel; wheat, for 37½ to 50 cents a bushel; pork, 1½ to 2 cents a pound; beef, at about the same price, and live stock at correspondingly low prices.

Oxen were employed in farm work to a greater extent than horses, even the early grist mills of the region being operated by them.

Clinton County has remained preeminently an agricultural county. Corn has given place to wheat, while orchards of apples and peaches have been introduced.

CLIMATE.

The normal temperature and precipitation are indicated in the appended table, giving the records of three Weather Bureau stations in surrounding counties. Greenville lies about 15 miles north of the area, in Bond County; Mascoutah, about 5 miles west, in St. Clair County, and Plumhill about 7 miles south, in Washington County. Within Clinton County itself there is no station.

Normal monthly and annual temperature and precipitation.

Month.	Temperature.			Precipitation.		
	Greenville.	Mascoutah.	Plumhill.	Greenville.	Mascoutah.	Plumhill.
	°F.	°F.	°F.	*Inches.*	*Inches.*	*Inches.*
January	28.8	31.3	31.2	2.90	2.82	2.62
February	31.0	31.3	31.7	3.36	3.21	3.05
March	41.0	42.5	42.8	3.58	4.06	4.46
April	55.4	55.4	55.2	4.16	4.11	3.42
May	63.8	63.9	65.5	5.03	4.97	3.90
June	73.3	75.6	73.3	4.91	4.31	4.47
July	77.8	78.9	78.3	3.53	2.89	3.87
August	75.6	76.4	76.3	2.72	2.33	2.66
September	68.7	70.2	69.9	3.32	3.27	3.42
October	56.4	56.2	56.8	2.60	1.98	2.09
November	41.7	42.1	43.5	3.85	3.55	3.22
December	34.1	35.3	34.7	3.01	2.35	3.04
Year	53.9	54.9	54.9	43.03	39.76	40.27

The average date of the last killing frost in spring at Greenville is April 26, at Mascoutah April 25, and at Plumhill April 14; while the first destructive frost in fall occurs on October 9, October 10, and October 13, for the respective stations in the order given.

PHYSIOGRAPHY AND GEOLOGY.

Clinton County consists of a level prairie interrupted only by the broad bottom lands along the principal stream courses and by the scattered hills formed by the morainal deposits of the Illinois glaciation. The lowest points of the prairie are in the southeastern portion of the county, though the surface slope toward the northwest is so gradual as to be almost imperceptible. The morainal hills vary in extent from a few acres to masses covering 2 or 3 square miles. None of them attain an elevation greater than 250 feet above the surrounding plain. These hills are conical or lenticular in shape. The Kaskaskia River and its tributaries have cut broad, shallow valleys through the prairies. The streams of Clinton County are at present engaged in building up their flood plains, and only short, minor streams are cutting down their beds.

Below Carlyle the Kaskaskia bottom is extensively cultivated, and its soils give the best yields in the county. The Shoal Creek bottoms are also cultivated to some extent, otherwise the stream bottoms of the county are for the most part forested. The timber comprises several varieties of oak, water maple, hickory, elm, cottonwood, and sycamore. The margins of the prairie adjoining the stream bottoms were also originally forested and have only been partially cleared. The prairie proper at the time of the first settlement supported only scattered groups of cottonwood and maple. The morainal hills were for the most part heavily timbered. At present they are almost all cleared.

The consolidated rocks which form the basal foundation of Clinton County consist of sandstone, limestone, and shale of the Upper Coal Measures. Bituminous coal is reached at a depth of about 350 feet in the western part of the county. A gentle dip to the southeast carries this coal to a depth of about 500 feet near the eastern boundary. The principal coal mines are located near Trenton and Breese. The output is chiefly used by the railroads crossing the county. The rocks of the Coal Measures are overlain by the gravelly yellow and blue till of the Illinois glaciation. This material reaches the surface only in stream cuts and railroad excavations, its thickness varying considerably. Under the prairie the average thickness of the Illinois till is about 20 feet. In the morainal hills its depth increases to about 200 feet. The till proper is overlain by 2 to 6 feet of mottled, gray, and yellow silty clay, which forms the common subsoil of the prairie region. The surface soil of the prairie region consists of 8 to 24 inches of very fine sand and silt. There is no distinct boundary line between the gravelly till and the overlying silty clay. The line of demarcation between this silty clay and the surface loam is fairly sharp in all cases. Along the western border of the county the silty clay becomes more yellow

and closely resembles typical loess. Its demarcation from the underlying till is also sharp in this region.

The gravel of the Illinois till varies from small quartz pebbles of the size of a pea to bowlders of sandstone, limestone, granite, and diabase, having a weight of 1 or 2 tons. Gravel the size of a hen's egg predominates over the finer or coarser material. The matrix in which this gravel is found consists of a hard, plastic yellowish clay. Yellow stains of hydrated oxide of iron are numerous, and in some instances well-developed nodules of crystalline aggregates of gypsum are associated with the iron stains. Fantastic calcareous concretions are also found in the till. In some localities the till is jointed and crusts of hydrated oxide of iron have formed along the joints. The yellow silty clay contains no pebbles. Near its surface it is subject to the accumulation of salts of iron and lime, which form a hardpan of quite general distribution throughout the prairie region. This silty clay overlies the till over both the prairie region and the highest summits of the morainal hills. It resembles loess to a limited degree, but differs materially from the typical loess.

Since the close of the Glacial epoch the principal streams of the region have reworked the materials derived from the upland, building up alluvial bottoms, which, owing to the sorting power of moving water, are more varied in composition and texture than the uplands from which the material was derived. The Kaskaskia River, being the most powerful stream flowing through the county, has given a wider range to the sediments of its bottom lands than any of the minor streams.

SOILS.

The surface of Clinton County is occupied by seven distinct types of soil. Four of these are found in the stream bottoms, two upon the prairies, and one upon the morainal hills. The differences that exist between these soils are due chiefly to texture, topographic position, and drainage. Thus in the bottom lands all of the soils are subject to periodic overflow unless protected by levees. Owing to differences in texture four distinct varieties of soil may be identified, ranging from a yellow sandy loam found along the front lands of the Kaskaskia River, to the sticky, plastic clays of the lower sloughs locally known as "gumbo." The depth at which these bottom lands are permanently saturated with water also constitutes a difference between the types.

The chief factor in the control of crop production is the maintenance in the soil of the exact amount of water required to carry plant food into solution and to furnish the large amount of moisture which must be exhaled by each plant during the growing season. The maintenance of this moisture in the soil and the control of its circulation depend first upon the size of the individual soil particles. The relative size of the particles of a soil is called the texture of the soil. The

arrangement of these particles in space and the consequent proportion and distribution of pore space in the soil constitutes the structure of the soil. The two are closely related. In addition natural drainage and the proximity of the water table to the surface affect the supply and circulation of soil moisture.

The texture of the soil is determined by grading the different-sized particles according to a definite scale. The finest particles, which give plasticity to the soil, are called clay. Those next coarser constitute the silt, and the particles large enough to be distinguished by the naked eye form several grades of sand and the fine and coarse gravel. The mechanical analyses given with the soil types thus express the textures of the various soil types, establishing clays, loams, sandy loams, etc., according to variation in texture.

The areas of the different types found in Clinton County are given in the following table:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Marion silt loam	172,480	54.9	Yazoo clay	5,376	1.7
Miami silt loam	57,472	18.3	Yazoo sandy loam	2,176	.7
Waverly silt loam	42,112	13.4	Total	314,111	.....
Kaskaskia loam	24,576	7.8			
Edgerton silt loam	9,920	3.2			

EDGERTON SILT LOAM.

The Edgerton silt loam consists of a very fine yellowish sandy and silty loam soil having a depth of about 12 inches. This is underlain by a massive yellow silty clay subsoil. The thickness of the immediate subsoil usually exceeds 5 or 6 feet, and it rests upon the gravelly yellow or blue clay of the Illinois till. The surface soil is friable and powdery when dry, but packs to a firm surface when wet. It forms clods if cultivated before becoming sufficiently dry. The line between the soil and the subsoil is quite distinct, being a natural division between two classes of material rather than an artificial boundary established by cultivation. The subsoil is a dense, massive, uniform body of reddish-yellow silty clay. The color is darker near the surface, grading down to a lighter yellow with increased depth. There is no pronounced mottling.

The Edgerton silt loam occupies scattered areas in the central and western parts of Clinton County. This type is almost coextensive with the rounded hills and long low ridges which interrupt the almost absolute level of the prairie region of the county. These hills represent the morainal deposits of the Illinois glaciation. They are roughly oval in form and rarely exceed an elevation of 125 feet above the level of the surrounding prairie.

Owing to the elevated position occupied by the Edgerton silt loam, it possesses the best natural drainage of any of the soil types encountered in the area. This drainage is accomplished in part by seepage through the soil and subsoil and in part by surface flowage. For this reason the Edgerton silt loam is somewhat subject to soil wash along the steeper flanks of the hills and some care is required to prevent the formation of gullies.

The Edgerton silt loam forms one phase of the extensive loesslike deposits which overlie the gravelly till of the Illinois glaciation. Throughout its extent this material consists of very fine-grained sediments, whose origin and method of deposition have not been definitely determined by students of geology. It is believed, however, that it has been brought to its present position in part by the agency of wind and in part by water. The Edgerton silt loam is marked by the absence of the iron nodules and hardpan so prevalent in the prairie. This characteristic, together with its advantage of drainage, makes it one of the most desirable soils of Clinton County. It produces from 15 to 20 bushels of wheat, from 25 to 35 bushels of corn, about the same quantity of oats, and an average of 1 ton of hay per acre. Owing to the absence of hardpan, deep-rooted crops like clover and corn can thrive better upon the Edgerton silt loam than upon the prairie.

Many orchards of apples and peaches are located upon this type, and where properly cared for, the trees are thrifty and produce good yields. In too many instances the orchards are not properly cultivated or fertilized, and an attempt is made to produce grain or other crops between the rows even after the trees have reached the bearing age. The Edgerton silt loam is also suited to the production of grapes, cane fruits, and strawberries.

The following mechanical analyses show the uniform texture of this soil as it occurs in different localities:

Mechanical analyses of Edgerton silt loam.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
6750	2 miles SE. of Breese.	Yellow silty loam, 0 to 9 inches.	1.44	0.16	0.40	0.36	0.72	4.42	81.06	9.88
6748	3½ miles SW. of Keyesport.	Yellow fine sandy loam, 0 to 9 inches.	1.44	.16	.76	.82	1.72	5.34	76.64	14.44
6751	Subsoil of 6750.....	Yellow silty loam, 9 to 40 inches.	.46	Tr.	.16	.16	.70	3.56	78.52	16.86
6749	Subsoil of 6748.....	Yellow silty clay, 9 to 40 inches.	.25	.20	.60	.56	1.14	3.84	70.86	22.80

MARION SILT LOAM.

The Marion silt loam is marked by a gray or yellowish-white surface soil consisting almost entirely of very fine sand or silt. This soil varies considerably in depth in different parts of the county, the average for the entire area being 12 inches. The soil is underlain by a white to ash-colored silt, locally mottled with stains of hydrous iron oxide or containing closely packed concretions of that material. This layer may be an inch or two in thickness, in which case it is hardly noticeable, or it may form a massive stratum nearly a foot thick. It is then called hardpan. The real subsoil of the Marion silt loam consists of a hard, stiff silty clay of mottled appearance, the prevailing colors being gray, light yellow, and reddish yellow. Where this subsoil is exposed in natural or artificial cuts, the shrinkage due to drying causes it to check into irregular angular fragments consolidated to a stony hardness.

The Marion silt loam occupies the level prairie land comprising the eastern three-fourths of the county. It is interrupted only by the low morainal hills, which are occupied by the Edgerton silt loam and by the broad, shallow valleys of the principal streams of the region. There are few minor streams draining the prairie land, and the precipitation which falls upon its surface is carried off by artificial ditches or by seepage through the soil.

The materials forming the Marion silt loam, like those of the Edgerton silt loam, are of loessial origin. The total thickness of this material is only 10 or 12 feet throughout the prairie region. It directly overlies the Illinois till, with no pronounced break between the two classes of material. The only constant difference between them is marked by the presence of gravel in the till.

The most important feature of the Marion silt loam is the presence at varying depths between the soil and subsoil of the iron hardpan already mentioned. This hardpan is found in all stages of development, from a faint ocherous stain to a compact mass of small-sized iron gravel embedded in the silt and clay. Concretions of calcium carbonate and crystals of calcium sulphate (gypsum) are associated with the iron nodules. The exposed edges of this hardpan, frequently encountered in ditches, are coated with stalactitic layers of clay hardened into a compact mass by lime salts until the surface resembles the incrustations of calcareous tufa frequently encountered in the vicinity of hot springs.

The Marion silt loam is devoted chiefly to the production of winter wheat. The yield in Clinton County is from 8 to 12 bushels per acre. The oats yield about 25 bushels per acre, and hay, chiefly timothy, about three-fourths of a ton per acre, while only sufficient amounts of corn and potatoes are raised for consumption on the farm. Wheat

has been the principal crop raised on this type of soil since the settlement of the county. The shallowness of the soil and the extensive development of hardpan throughout this type interfere with the production of deep-rooting crops like corn and clover and restrict the crop rotation which may be practiced on this soil. Fruit trees thrive on the Marion silt loam. Apples are produced to better advantage than peaches. At present nearly every farm possesses a small orchard of different fruits intended chiefly for home use. These orchards are usually poorly cared for, though a few of the farmers located on this type have given special attention to orcharding with considerable success.

With proper underdrainage peaches and cane fruits could be successfully cultivated, as well as apples and pears. The orchard industry should be more systematically developed, as the climate and proximity to markets favor this industry.

The following mechanical analyses show the physical texture of the soil and subsoil of this type:

Mechanical analyses of Marion silt loam.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.5 mm.	Silt, 0.05 to 0.005.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
6738	5 miles SW. of Carlyle.	Very fine sandy loam, 0 to 10 inches.	1.17	0.56	1.14	0.64	0.72	7.04	79.88	9.00
6736	1¼ miles S. of St. Rose.	Gray silty loam, 0 to 15 inches.	1.87	.14	.96	.56	1.06	8.42	77.88	10.60
6734	1 mile NE. of Huey.	Very fine sandy loam, 0 to 18 inches.	1.78	.40	1.02	.76	1.48	4.50	77.86	12.44
6737	Subsoil of 6736.....	Silty clay, 15 to 36 inches.	.39	.12	.52	.46	1.02	10.42	67.62	19.84
6735	Subsoil of 6734.....	Silty clay, 18 to 36 inches.	5.82	.88	1.78	1.10	1.96	10.70	60.88	22.40
6739	Subsoil of 6738.....	Hardpan, 10 to 40 inches.	.36	.48	1.44	.88	.98	5.06	68.64	22.52

MIAMI SILT LOAM.

The surface soil of the Miami silt loam consists of 18 inches of brown silty and fine sandy loam. It is somewhat sticky when moist, from the presence of a small amount of clay. This soil grades downward to a yellowish-brown silty clay, which is decidedly stiff and tenacious. In some cases the subsoil contains small amounts of iron concretions below 36 inches, but no pronounced hardpan is found in this type.

The Miami silt loam occupies the gently rolling prairie in the west-

ern and northwestern part of Clinton County. The variations in elevation in this prairie are slight, but they are sufficient to give a better natural drainage than is found farther eastward. This type is also drained by a greater number of small streams than is the Marion silt loam.

The Miami silt loam is derived from loesslike materials covering the till of the Illinois glaciation. It differs from the other soils in the county similarly derived by possessing a greater depth of surface soil, a larger proportion of organic matter in this surface soil, and by the almost total absence of hardpan between soil and subsoil. On account of these characteristics it is more fertile and more retentive of moisture during the growing season than the Marion silt loam.

Wheat and corn are both produced to advantage on this soil, while clover and timothy yield fair crops. The average yield of wheat per acre on this type in Clinton County is from 18 to 20 bushels, that of corn from 40 to 45 bushels, and of hay from 1 to 1½ tons. Many small vineyards and orchards of apples and peaches are located on this soil type, furnishing a supply of fruit for home consumption. On this type dairying is carried on to a greater extent than on others in the county, though this is in part due to proximity to the St. Louis market, to which the bulk of the milk is shipped. The remainder is made into butter or used for the manufacture of condensed milk.

The Miami silt loam is the most productive soil in Clinton County outside of the bottom lands. The following mechanical analyses show the texture of this type:

Mechanical analyses of Miami silt loam.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
6752	1¼ miles NW. of Trenton.	Silty loam, 0 to 18 inches.	1.64	0.52	0.56	0.44	0.50	6.64	82.60	8.74
6753	Subsoil of 6752.....	Silty loam, 18 to 40 inches.	.62	.56	.60	.36	.60	4.80	74.58	18.46

WAVERLY SILT LOAM.

The surface soil of the Waverly silt loam consists of about 10 inches of brown silty loam. It is underlain by a silty loam subsoil, grayish or yellowish in color, containing a larger proportion of clay. This soil occupies the greater proportion of the bottom lands along the minor streams and the higher portions of the Kaskaskia River bottom. Near

the low cliff line which borders these bottoms the surface of this soil slopes gently toward the streams. Elsewhere it is nearly level. The Waverly silt loam is subject to overflow during the spring freshets, and even during the drier periods of midsummer the subsoil is usually saturated at a depth of 4 or 5 feet. The surface of the soil is usually sufficiently elevated above the normal stream level to insure fair drainage during the growing season, while, on the other hand, it is near enough the permanent water table to furnish an ample supply of moisture through capillary circulation. It only requires a small amount of diking for protection against unseasonable floods to constitute this soil one of the most valuable occurring in Clinton County.

The Waverly silt loam owes its origin to the accumulation of sediments washed down from the adjoining prairies and from areas outside the county near the headwaters of the streams along which it occurs. It thus consists of reworked silty material derived from the upland, mingled with organic matter and clay. It combines the usual advantages of alluvial origin and a favorable texture with a position favoring the maintenance of an adequate water supply during the growing season. At present fully 75 per cent of this type is clothed with a forest growth of oak, water maple, hickory, and cottonwood, with a few scattered pecan trees. The remaining 25 per cent is cultivated almost exclusively to corn. The average yield is about 40 bushels per acre. The value of the timber in the forested portions is hardly sufficient to offset the expense of clearing. No systematic attempt has been made toward diking or draining the minor stream bottoms, although the crop returns from the cultivated portions indicate that the best corn lands of the region are located here. It is in these localities that the most thorough control of the water supply could be obtained.

The following mechanical analyses show the texture of the Waverly silt loam:

Mechanical analyses of Waverly silt loam.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
6744	2½ miles SW. of Keyesport.	Gray silty loam, 0 to 12 inches.	1.80	Trace	0.42	0.56	2.18	4.46	77.56	14.52
6746	4¾ miles S. of Junkersville.	Gray silty loam, 0 to 14 inches.	2.23	.54	2.04	.98	1.34	10.60	67.54	16.74
6745	Subsoil of 6744.....	Mottled silty loam, 12 to 40 inches.	.36	.22	1.02	.72	4.38	8.30	72.06	13.20
6747	Subsoil of 6746.....	Mottled silty clay, 14 to 36 inches.	.55	.40	1.10	.54	1.16	3.58	64.30	28.92

KASKASKIA LOAM.

The surface soil of the Kaskaskia loam consists of about 8 inches of a brownish loam containing some medium sand. The subsoil is a gray loam somewhat mottled and iron-stained. It usually contains more sand than the surface soil, though near the borders it is apt to become quite clayey. This soil occupies large areas in the Kaskaskia River bottom and along the lower courses of the larger tributary streams. Its surface is usually level, though small, minor depressions indicate old stream channels.

The Kaskaskia loam, unless diked, is subject to annual overflow, and during the greater part of the season the water table stands within 3 feet of its surface. Broad, open ditches are at present employed for the drainage of this soil type. It is sufficiently porous for the practice of tile drainage. A small portion of this type is included within the Santa Fe drainage district.

The Kaskaskia loam is an alluvial soil, which owes its origin to oft repeated overflows of the streams along which it is found. It is composed of mingled sand, clay, silt, and organic matter. Outside of the diked areas it is receiving fresh accessions of material annually. It is abundantly fertile. Its texture is favorable both to easy drainage and easy cultivation, and it only requires underdrainage and protection from overflows to make it one of the most productive and valuable of the soils of the county.

At present two-thirds of its surface is covered by an open forest of oak and water maple. The cultivated areas of the Kaskaskia loam produce about 25 bushels of wheat per acre, 50 bushels of corn, about the same of oats, and good yields of clover and timothy hay.

The following table gives the mechanical analyses of the Kaskaskia loam:

Mechanical analyses of Kaskaskia loam.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
6742	3 miles S. of Germantown.	Brown loam, 0 to 8 inches.	2.15	0.62	1.48	1.14	5.38	8.36	67.56	15.98
7528	7 miles S. of New Baden.	Brown loam, 0 to 12 inches.	2.69	.20	2.38	4.52	3.30	4.38	57.06	28.00
6743	Subsoil of 6742.....	Mottled gray loam, 8 to 36 inches.	.70	1.10	1.54	.98	3.60	5.68	64.68	22.52
7529	Subsoil of 7528.....	Heavy drab silty clay, 12 to 36 inches.	1.00	.72	2.94	5.86	2.70	3.62	60.98	23.14

YAZOO SANDY LOAM.

The front lands along the Kaskaskia River, particularly near the large bends, are occupied by a yellow fine sandy loam having a depth of about 12 inches. This is underlain to a depth of 40 inches or more by a grayish-yellow sandy loam, slightly mottled with stains of hydrated iron oxide. The largest single area of this soil is found in eastern Santa Fe Township, where the Kaskaskia River swings to the southwest.

The surface of this type is nearly level and slightly elevated above the general surface of the bottom lands. It is subject to frequent overflow, but its advantage of elevation, its location near the deeper stream channels, and its porous nature allow of rapid drainage after the subsidence of the water. This soil has been accumulated through the deposition of the coarser material carried by the streams at time of floods. As the currents break from their usual channels their force is first checked near the banks. Since the power to carry sediments varies with the velocity of the current, the coarser sediments are almost immediately deposited in the form of sand bars or sand plains. Successive inundations increase the elevation and area of these deposits. Some organic matter is constantly mingled with the sand and silt, and the whole is built up gradually into a sandy loam.

The Yazoo sandy loam is devoted almost exclusively to the production of corn. The yield varies considerably with seasonal conditions, the average production falling between 30 and 45 bushels per acre. If properly protected by dikes this type is well adapted to the production of truck crops, such as early Irish potatoes, sweet potatoes, watermelons, tomatoes, cantaloupes, sugar corn, and green peas. The largest area found in Clinton County is crossed by one of the principal railroads, so that market facilities can be easily obtained.

The following mechanical analyses show the texture of this soil:

Mechanical analyses of Yazoo sandy loam.

[Fine earth.]

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
6754	4¼ miles SE. of Junkersville.	Fine sandy loam, 0 to 9 inches.	1.72	0.42	1.40	3.44	15.66	9.44	55.84	13.80
6755	Subsoil of 6754.....	Sandy loam, 9 to 36 inches.	.67	.44	1.40	2.92	14.24	7.98	56.98	15.96

YAZOO CLAY.

The surface 5 inches of the Yazoo clay consists of a sticky brown or drab clay loam, easily distinguished by its cracking into irregular angular pellets and granules when thoroughly dried. This surface soil is underlain to a depth of 40 inches by stiff plastic drab or yellowish clay. The soil is commonly saturated with water below 2 feet.

In Clinton County the Yazoo clay occupies small areas of depressions in the broader bottom lands. The hollows mark the position of former stream channels or little lake beds. They are usually of small extent, though one large one exists southwest of Keyesport in the Kaskaskia bottom. This soil is locally known as "gumbo." On account of its dense, fine-grained character and low-lying position this soil is poorly drained, and it is almost entirely uncultivated.

Like the other soils of the bottom lands, the Yazoo clay is of alluvial origin. At times of overflow that portion of the water left behind after the recession of the flood has accumulated in the low depressions and slowly deposited the finest sediments carried by the streams. These areas are thus occupied by the most plastic clay found in the county. The Yazoo clay is best adapted, when properly drained, to the production of wheat and grass.

The following mechanical analyses show the large amount of clay present in this soil:

Mechanical analyses of Yazoo clay.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
6756	3¼ miles E. of Junkersville.	Drab clay loam, 0 to 6 inches.	2.01	0.60	0.76	0.34	2.36	5.20	66.14	24.50
6758	2 miles S. of Keyesport.	Drab clay, 0 to 6 inches.	4.10	.42	1.12	1.14	3.46	3.00	52.78	38.06
6757	Subsoil of 6756.....	Drab clay, 6 to 40 inches.	.88	.78	.74	.34	1.86	5.26	68.00	22.36
6759	Subsoil of 6758.....	Drab clay, 6 to 36 inches.	.94	.06	.34	.36	1.56	1.48	54.80	41.08

AGRICULTURAL CONDITIONS.

The condition of agriculture in Clinton County varies considerably, depending upon the character of the soils found in different parts of the county. The level prairies of the eastern and central portion have been farmed to wheat since the first general settlement of the county under the early preemption laws of the United States Government.

Oats, corn, rye, grass, and potatoes are subordinate crops. The yield of wheat varies from 8 to 10 bushels in unfavorable seasons to a maximum of about 15 bushels per acre. The farms are operated chiefly by the owners, though some of them are leased for a money rental or a share of the products. The average size of the farms throughout the county is about 100 acres. Usually farm operations are carried on by the owner or tenant, aided by the members of his family. Extra hands are hired during harvesting.

In the bottom lands and on the Miami silt loam corn and wheat are raised extensively; otherwise the agriculture differs little from that of the prairie lands to the east.

With the first settlement of Clinton County small apple orchards were planted on each farm, and these have been renewed and increased from time to time, more for the supply of the home market than for exportation. During the last fifteen years several extensive orchards of peaches, pears, and apples have been set out for the production of fruit on a commercial scale. The pears and apples have proved more profitable than the peaches. The importance of clean cultivation in the young orchards and of careful pruning and spraying have not been sufficiently understood. These attempts, while not fully successful, have demonstrated the possibility of profitable fruit culture within the area. The climatic conditions are favorable to fruit culture, the area is well located with regard to transportation facilities, and the results already achieved demonstrate that the presence of the iron hardpan in the Marion silt loam is not detrimental to the thrifty growth and abundant productivity of apple and pear orchards located upon this type. On the other hand, the hardpan does preclude the profitable cultivation of corn, clover, and other deep-rooting crops and reduces the yield of wheat, oats, and timothy. Peaches, grapes, and cane fruits can be successfully raised on the Edgerton silt loam and the Miami silt loam. None of the bottom lands are adapted to the production of perennial fruit crops. If protected from overflow strawberries could be raised successfully on the Yazoo sandy loam.

The great uniformity of the soil of the upland portion of the county has led to a uniformity in crop production. The distinction recognized between the Miami silt loam and the Marion silt loam is that corn is a certain crop on the former and a very uncertain crop on the latter. The bottom lands are also recognized as better adapted to corn than the greater part of the prairie. Otherwise there is very little adaptation of crop to soil in Clinton County.

The usual equipment of the farm in Clinton County consists of a frame dwelling house, horse barn, and outbuildings. Grain is thrashed and the straw stacked in the field, the grain being shipped almost immediately. A large proportion of the hay is stored for feeding in the stock barn and the remainder is stacked in the field. Stable manures

are used and some straw is employed for mulching potato fields and ultimately plowed under. The remainder of the straw is fed or sold to paper mills. No commercial or mineral fertilizers are used in the county.

The live stock upon the farm consists of work horses or mules and several milch cows. Considerable milk is exported from the county and the remainder is manufactured into butter. No cheese is made.

When it is considered that Clinton County is located within 50 miles of the St. Louis market, that it is crossed by several trunk lines of railroad, that it has been settled for nearly a century, and that it possesses a considerable variety of soils and a large supply of bituminous coal, easily accessible, it becomes evident that the opportunities for agricultural development have not been adequately appreciated up to the present time. Market gardening and trucking are almost unknown in the county, though the climate, soil, and proximity to markets favor these branches of farming. Likewise the production of fruit has only been attempted successfully by a few of the more enterprising farmers. Underdrainage by the use of tile is almost unknown in the county, though the greater part of the prairie land requires such treatment. The bottom lands have only been partly cleared and, though their soils are the most fertile in the county, not over 5,000 acres are properly diked and drained.

Clinton County presents an excellent field for both experimental and practical work in the reclaiming of lands subject to overflow, in the renovating of prairie lands injured by the presence of hardpan, and in the general improvement of cultural methods. These are needed at present more than the introduction of new crops or the exploitation of new markets.

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BUREAU OF SOILS
MILTON WHITNEY, CHIEF

SOIL MAP
ILLINOIS
CLINTON CO. SHEET

ILLINOIS AGRICULTURAL EXPERIMENT STATION
DEPARTMENT OF AGRONOMY AND CHEMISTRY
C.C. HOPKINS CHIEF

R. 5 W. R. 4 W. R. 3 W. R. 2 W. R. 1 W.

T. 3 N. T. 2 N. T. 1 S.

STROSE WHEATFIELD IRISHTOWN EASTERN BOULDER
SUGAR CREEK BREESE WADE CLEMENT MERIDIAN
GLASS GERMANTOWN SANTA FE BROOKSIDE
LOOKING LAKE

Frogstown P.O.
Miley P.O.
ST. ROSE
TRENTON
AVISTON
BREESE
CARLYLE
RUTON
KEYESPORT
BOULDER
NEW BADEN
GERMANTOWN
JUNKERVILLE
Posey Sta.
NEW MEMPHIS
JAMESTOWN

Scale 1 inch 1 mile

Soils Surveyed by
Jay A. Bonsteel, Geo. N. Coffey
R.C. Lloyd and W.H. Knox
1902

Field Operations
Bureau of Soils
1902

SOIL PROFILE
(3 feet deep)

- Marion silt loam — Sc / Scc
- Waverly silt loam — Sc / Scc
- Miami silt loam — Sc / Scc
- Kaskaskia loam — Sc / Sc
- Edgerton loam — Sc / Scc
- Yazoo sandy loam — Ssc / Ssc
- Yazoo clay — Sc / C

LEGEND

Sc Loam
Scc Clay loam
Ssc Sandy loam
C Clay

LEGEND

- Ms — Marion silt loam
- Ws — Waverly silt loam
- Mi — Miami silt loam
- Kl — Kaskaskia loam
- El — Edgerton loam
- Ys — Yazoo sandy loam
- Yc — Yazoo clay